WASTE MANAGEMENT

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WASTE MANAGEMENT AND MINIMISING OUR IMPACT ON THE ENVIRONMENT IS AT THE HEART OF EVERYTHING WE DO

Unlike power stations that burn fossil fuels, such as coal and natural gas, **nuclear power stations do not release harmful emissions** into the atmosphere when they produce energy.

ONR Office for Nuclear Regulation

As with all industrial processes, there are **some authorised discharges** to the environment. These will be kept as low as possible, closely **monitored and reported by the industry's independent regulators** to ensure they fall within extremely stringent guidelines

The nuclear fission process produces a wide range of 'fission products', with radioactive half-lives that range from extremely short to very long time-scales. The **UK has a world-leading record** in safely handling and storing the waste that is generated while providing sustainable, low-carbon power.

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THE ROLLS-ROYCE SMR PRODUCES DIFFERENT FORMS OF WASTE, BOTH CONVENTIONAL AND THOSE SPECIFIC TO NUCLEAR POWER

FISSION PRODUCTS (SPENT FUEL)

Over its 60-year lifetime, the Rolls-Royce SMR generates around **285m³ of spent nuclear fuel** (about the size of a tennis court if stacked 1 metre high). The spent fuel contains more than 99% of the radioactivity.

Because we use standard uranium nuclear fuel, waste management **regulations processes are already well understood.**

NON-FISSION PRODUCTS

In addition to the spent fuel, the Rolls-Royce SMR produces gaseous, liquid and solid wastes including chemical wastes, waste oil, solvents, ion exchange resins, filters, sludges, waste metal and general waste (such as bags, packaging, tissues and gloves that might also come from a hospital X-Ray or radiotherapy department).

STANDARD WASTE

Not all waste is radioactive, and a Rolls-Royce SMR power station will also produce waste such as cardboard, paper, glass, cans and other materials. **The technology is being designed with sustainability in mind** and preventing waste production in the first place is a key goal for Rolls-Royce SMR.

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WE REDUCE AND MANAGE WASTE EFFICIENTLY BY BRINGING INNOVATION TO OUR DESIGN AND USING INDUSTRY STANDARD FUEL

BORON-FREE OPERATION

In a standard PWR, soluble Boron is used as a neutron-absorber helping to control radioactivity (power output). However, Boron is a hazardous chemical and its use in a reactor under normal operations is responsible for up to 90% of tritium (a waste product) produced. In the Rolls-Royce SMR, we use an innovative Potassium-based chemistry, which doesn't require soluble Boron and **eliminates the need for liquid effluent discharges** under normal operating conditions.

BACKWASHABLE FILTERS

Waste-water, containing radioactive contaminants and other waste products in a nuclear plant, is filtered to ensure it can be handled safely and, ultimately, discharged to the environment. The Rolls-Royce SMR swaps standard cartridge filters for backwashable filters, which **reduce the overall volume of Intermediate Liquid Waste (ILW)** needing to be stored by up to 50% and **reduces total waste packages by up to 85%** compared with a standard PWR.

ON-SITE STORAGE

Deep geological disposal, in a specifically designed and engineered vault constructed kilometres underground (a GDF), is internationally recognised as the best solution for the disposal of higher activity waste.

Until a GDF is available for long-term storage, o**ur SMR is designed to store all spent fuel onsite** in industry standard casks for the life-time of its operation – at least **60 years**.

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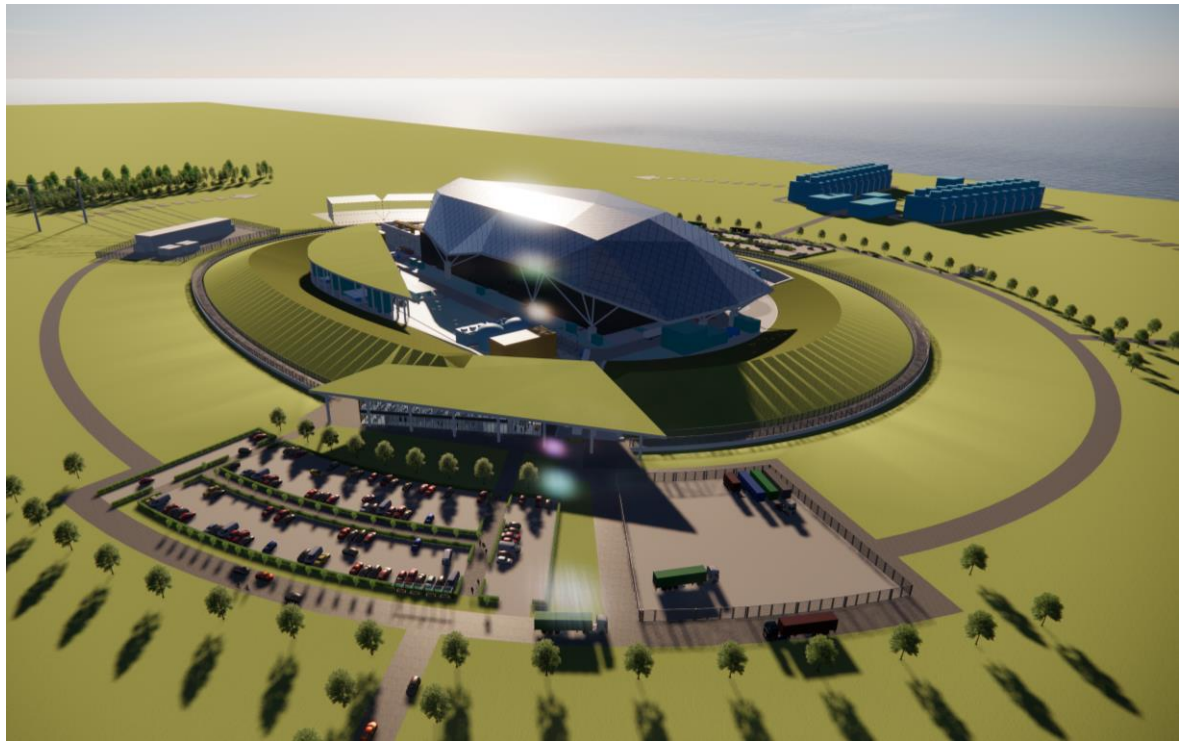
AT THE END OF ITS LIFE, EACH ROLLS-ROYCE SMR WILL BE DECOMMISSIONED IN LINE WITH ALL REGULATORY REQUIREMENTS



- As well as minimising the production of waste throughout our powerplant's manufacturing, construction and operation, we have an obligation to regulators, the environment and our communities to **decommission our powerplant safely**.
- In the UK, a **nuclear operator pays a levy** during each year of operation to fund the decommissioning of the powerplant and ultimate return of the site to its original status
- The levy is already accounted for in our highly competitive Levelized Cost of Electricity (LCOE) that underpins the economics of our powerplant
- This feature is unique to nuclear power, meaning it is the only form of power generation, clean or otherwise, to **fully fund its own decommissioning/disposal**

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SMR

BE SAFE. BE BOLD. BE INCLUSIVE. BE IMPACTFUL. BE CREATIVE. BE ENGAGED

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